

WHAT IS CLAIMED IS:

- 1           1.     A body fluid sampling device comprising:  
2                 a cartridge containing a plurality of penetrating members;  
3                 a plurality of analyte detecting members on said cartridge, wherein a first  
4     portion of the analyte detecting members measure a first analyte and a second portion of  
5     the analyte detecting members measure a second analyte; and  
6                 a penetrating member driver for moving an active one of said penetrating  
7     members from a first position outward to penetrate tissue.
- 1           2.     The device of claim 1 wherein the penetrating member driver is  
2     coupled to a position sensor, said position sensor used to detect a position of the active  
3     one of said penetrating member while penetrating tissue.
- 1           3.     The device of claim 1 wherein said first portion of analyte  
2     detecting members are all located on one area of the cartridge while said second portion  
3     of analyte detecting members are all located on a second area of the cartridge.
- 1           4.     The device of claim 1 wherein said first portion of analyte  
2     detecting members measure analytes related to blood gases.
- 1           5.     The device of claim 1 wherein said second portion of analyte  
2     detecting members measure analytes related to electrolytes.
- 1           6.     The device of claim 1 wherein said second portion of analyte  
2     detecting members measure analytes related to at least one of the following: blood gases,  
3     electrolytes, coagulation, or metabolites.
- 1           7.     The device of claim 1 further comprising handheld, two way  
2     communication, data management system.
- 1           8.     The device of claim 1 further comprising an integrated  
2     sampling/POC testing device for one step sample to read.

1                   9.     The device of claim 1 wherein body fluid requirement for each  
2     analyte detecting member is less than 1 microliter.

1                   10.    The device of claim 1 further comprising many tests on single  
2     penetrating member/analyte detecting member combination.

1                   11.    The device of claim 1 further comprising each segment has the  
2     same test or the cartridge can be divided into regions with a plurality of specific tests.

1                   12.    The device of claim 1 further comprising all tests run, subset  
2     reported, cost of test only for tests required.

1                   13.    The device of claim 1 wherein said analyte detecting members use  
2     either electrochemical, optical, or combinations of the measurement techniques.

1                   14.    The device of claim 1 further comprising a companion cartridge  
2     wherein additional analyte detecting members are coupled for more complex less  
3     common tests, only used if required.

1                   15.    The device of claim 1 further comprising analyte detecting  
2     members formed on the underside of cartridge, said members used for tests requiring  
3     larger surface area such as for washing steps in hematology or cell counting.

1                   16.    The device of claim 1 further comprising an upstream fixed volume  
2     chamber which empties instantaneously when full so that all tests start simultaneously.

1                   17.    The device of claim 1 further comprising vents, seals, fill detectors

1                   18.    The device of claim 1 further comprising cartridge vent system  
2     opens by piercing mechanism to allow on board calibration fluids to start flowing into  
3     relevant fluidic structures

1                   19.    The device of claim 1 further comprising optically interrogate from  
2     bottom as in F1 optical disclosure

1                   20.    The device of claim 1 further comprising array detection having a  
2     storage area having a sensing area;

3 another storage area having an enzyme area separate from the sensing area  
4 prior to tissue piercing;

5 wherein said storage areas and sensing area are positioned to cause fluid to  
6 first flow to the enzyme area and then to the sensing area.

1 21. A method of body fluid sampling comprising:  
2 moving a penetrating member at conforming to a selectable velocity  
3 profile or motion waveform;  
4 piercing a storage area having a sensing area;  
5 piercing another storage area having an enzyme area separate from the  
6 sensing area prior to piercing;  
7 causing fluid to first flow to the enzyme area and then to the sensing area.

1 22. The device of claim 1 further comprising storing said enzyme area  
2 in an inert environment different from an environment for the sensing area.

1 23. A device for body fluid sampling usable with a cartridge housing a  
2 plurality of penetrating members, the device comprising:  
3 a housing;  
4 a penetrating member driver coupled to said housing and for use with said  
5 cartridge;  
6 a processor for controlling said penetrating member driver to move at least  
7 one of said penetrating members at velocities which conform with a selectable velocity  
8 profile;  
9 a storage area having a sensing area;  
10 another storage area having an enzyme area separate from the sensing area  
11 prior to piercing;  
12 wherein said penetrating member pierces opens both storage areas upon  
13 member actuation and causing body fluid to first flow to the enzyme area and then to the  
14 sensing area.